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RESOURCE DATA AND SPECIES AT RISK SECTION

Western Blue Flag Conservation Program: 3-Year Summary Report

Alberta Species at Risk Report No. 85

Alberta SUSTAINABLE RESOURCE DEVELOPMENT

Alberta Conservation Association

Western Blue Flag Conservation Program: 3-Year Summary Report

Kathryn A. Romanchuk, Reg D. Ernst, and Richard W. Quinlan

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EXECUTIVE SUMMARY

Recovery planning for western blue flag (*Iris missouriensis*) began in 2001 following its approval to be legislated as a *Threatened* species in Alberta's *Wildlife Act*. A 12-member multi-stakeholder group formed the provincial recovery team, and a maintenance and recovery plan for western blue flag was developed in late 2001/early 2002. In April 2002 Alberta's Minister of Sustainable Resource Development approved the plan as the provincial recovery plan for the species. Major objectives included the development of an ongoing inventory and monitoring program for western blue flag and providing an updated status of western blue flag based on information from new sites. The Western Blue Flag Conservation Program is a cooperative and voluntary conservation initiative addressing the needs of this *threatened* species in the context of a landscape and the people living on that landscape.

The Western Blue Flag Conservation Program, managed by the Alberta Conservation Association, was established to deliver the monitoring and stewardship activities identified in the Action Plan. In 2003, two new landowners joined the program for a total of eight participants. In 2002 a monitoring protocol for the conservation program was initiated. This includes a landowner questionnaire, tracking of on-the-ground management on cooperating ranches, and monitoring the response of western blue flag over time.

Inventories in 2000 and 2001 had identified 11 known naturally occurring western blue flag sites in Alberta with a population estimate of 14,757 stems. The stem count estimate following the 2002 inventory increased to 69,200 stems. The current stem count estimate is 73,000 stems from 18 known sites. This increase in known number of sites has occurred largely because of a higher level of confidence by the ranching community in the maintenance and recovery plan, resulting in the reporting of additional sites.

This improved inventory has resulted in the Scientific Subcommittee of the Endangered Species Conservation Committee initiating another review of the provincial status of western blue flag.

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INTRODUCTION

The only known populations of western blue flag (*Iris missouriensis*) in Canada are located in Alberta. The species is restricted to a small area (300 sq. km.) in southwestern Alberta near Carway, plus two newly reported sites, one in Calgary and one in Fort Macleod. Due to its restricted range and low number of occurrences, western blue flag has been listed as *Threatened* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 1990. In 2000, COSEWIC reviewed the status of western blue flag in Canada and upheld its classification as *Threatened* (COSEWIC 2003). In September 2001 Alberta's Minister of Sustainable Resource Development approved western blue flag to be legislated as a *Threatened* species in Alberta's *Wildlife Act*. These actions stimulated the initiation of the recovery process for western blue flag.

In 2001 a team comprised of landowners, conservation groups, and resource managers known as the Canada Western Blue Flag Maintenance and Recovery Team was assembled to prepare the provincial recovery plan for western blue flag. In April 2002, Alberta's Minister of Sustainable Resource Development approved the plan as the Provincial Recovery Plan for the species. The long-term goal of the recovery plan is the maintenance of a sustainable population of this species in Canada. The short-term objective is to determine suitable management recommendations for western blue flag and to implement them at the individual ranch level (Canada Western Blue Flag Maintenance/Recovery Team 2002).

To gain the required landowner support, landowner consultations regarding the Western Blue Flag Conservation Program were initiated in spring 2001. By late 2001, several landowners agreed to participate in the program to inventory and monitor western blue flag. An inventory was done at all known western blue flag sites and a monitoring protocol was developed and implemented to facilitate tracking the abundance and distribution of western blue flag populations (Ernst 2003, Rangeland Conservation Service Ltd. 2003).

This report summarizes the activities leading up to ministerial approval of the recovery plan, provides western blue flag inventory and monitoring results, discusses the accomplishments during the first three years of plan implementation, and includes planned activities and recommendations for the upcoming year.

1.0 WESTERN BLUE FLAG – GENERAL DESCRIPTION

Western blue flag is a long-lived perennial that is a member of the Iris family. The plant is 30-60 cm tall, with pale blue-green sword like leaves that are 10-40 cm long and 5-10 mm wide. In Alberta, flowers generally appear between mid-June and mid-July, usually on leafless stems. The flowers are pale blue or blue-violet, with purple veins radiating from a bearded yellow spot on each of the outer segments (sepals). Flowers are usually in groups of two to four on a stem. Western blue flag reproduces through the production of seeds, and also spreads from a thick underground rootstock. Insects (usually bees) are responsible for pollination (Alberta Environmental Protection 1998). Generally, western

blue flag prefers sites where abundant spring and early summer moisture is present, but which dry out later in the season. It is normally found on level or slightly sloping ground with abundant subsurface moisture, commonly found growing at the edges of wet meadows or seepage springs. It can also appear near willow thickets in moist depressions. Light to moderate grazing has been noted as being beneficial to maintaining western blue flag (Ernst 2002).

2.0 WESTERN BLUE FLAG RECOVERY PLAN

In September 2001, a recovery team comprised of resource managers and stakeholders was assembled to prepare a provincial recovery plan for western blue flag. The recovery team is comprised of five Cardston ranchers, five representative stakeholders (Alberta Beef Producers [formerly the Alberta Cattle Commission], Alberta Conservation Association, Alberta Native Plant Council, Lethbridge Naturalists Society, and Society for Range Management), and two government departments (Alberta Fish and Wildlife Division and Alberta Parks and Protected Areas). Their goal was to develop a plan that would encourage range/habitat management to ensure the long-term maintenance of the naturally occurring populations of western blue flag in Canada. This was to be achieved through the cooperation and voluntary participation of landowners.

The *Maintenance and Recovery Plan for Western Blue Flag (Iris missouriensis) in Canada* was provided to the Alberta Endangered Species Conservation Committee (ESCC) in February 2002. On February 15 they were given a presentation summarizing the plan. On March 26, 2002 the ESCC recommended to the Minister of Sustainable Resource Development that the recovery plan be approved. On April 18, 2002 Hon. Mike Cardinal, Minister of Sustainable Resource Development, approved the plan as submitted by the team, as the Alberta Recovery Plan for western blue flag.

In late spring 2002, Alberta Fish and Wildlife requested Environment Canada to accept the Provincial Recovery Plan as the National Recovery Plan for western blue flag. This designation was delayed due to the process surrounding approval of the federal Species at Risk Act (SARA). On December 12, 2002 SARA received Royal Assent by the Parliament of Canada, which led to a multi-stage approval of the Act. On June 5, 2003 two-thirds of the SARA sections were in effect. SARA legislates western blue flag as a *Threatened* species and also requires that there must be a National Recovery Plan for western blue flag (and other *Threatened* species) by June 5, 2007. More information on SARA may be found on the government of Canada website located at http://www.speciesatrisk.gc.ca. A new request was submitted to Environment Canada on July 17, 2003 asking that the Alberta Recovery Plan for western blue flag also be approved as the National Recovery Plan for the species. It is currently under review for approval. Amendments to the plan may require the Western Blue Flag Maintenance and Recovery Team to reconvene.

2.1 Regulations for Western Blue Flag in Alberta

On January 11, 2002 the Western Blue Flag Maintenance and Recovery Team sent recommendations to the Director of Wildlife Management for Alberta regulations specific to western blue flag; those recommendations were also included in the recovery plan (Canada Western Blue Flag Maintenance/Recovery Team 2002). The regulations are currently under review.

2.2 Public Outreach

The *Maintenance and Recovery Plan for Western Blue Flag (Iris missouriensis) in Canada* was printed as Report #1 in a new Recovery Plan Report Series. Copies of the plan were distributed through Alberta Fish and Wildlife Offices, the Remington Carriage Centre in Cardston, and by members of the recovery team. In summer 2002 the report was posted on the Alberta Species at Risk Website located at: http://www3.gov.ab.ca/srd/fw/riskspecies/. A poster display describing the project was produced and set up at a public open house held on May 28, 2002 at the Remington Carriage Centre. It was also displayed at two conferences and during Wildlife Week in Lethbridge. Presentations on the Western Blue Flag Conservation Program were given at the Prairie Conservation Endangered Species Conference (PCESC) and the Alberta Environmentally Sustainable Agriculture (AESA) conference in late February and early March 2004.

The interpretive program at Police Outpost Provincial Park was to be amended to include information on western blue flag. Unfortunately, this did not occur because all interpretive services in the park were cancelled. Preliminary discussions have taken place regarding a volunteer role in delivering this action item. A species at risk sign that describes western blue flag has been erected at the park, and the most recent information brochure on the park includes a photograph of the flower.

2.3 2003 Annual Review Meeting

The Western Blue Flag Maintenance and Recovery Team is required to meet on an annual basis to review the recovery plan, review progress of implementation, and discuss any changes needed (Table 1). The team's first annual review meeting took place on July 17, 2003. For easy reference purposes, the implementation schedule included in this report is the same one that appears in the original western blue flag maintenance and recovery plan.

All but two of the activities set out in the implementation schedule have been completed or are due for completion within the next few years. The on-site interpretive events (*e.g.* short hikes, fireside talks, etc.) intended for Police Outpost Provincial Park as part of the park interpretive program initiative have been delayed due to funding cuts and restructuring of the department. As stewards of the natural area at POPP, it is possible that the Lethbridge Naturalists Society (LNS) could assist with some of the interpretive activities at the park in the upcoming year(s).

Table 1. Implementation of western blue flag maintenance/recovery plan

ACTIVITY	RESPONSIBILITY	INITIATE	COMPLETE
Plan Approval	AFWD*	2002	2002
Western Blue Flag Inventory	AFWD	2000/2001	Every 5 years
Range Management Plans	ACA**/AFWD	2001	2003
Range Improvements	ACA/AFWD/Landowners	2001	2004
Public Outreach	Maintenance/Recovery Team	2001	2002
Park Interpretive Program	APPA***	2002	2003
Regulations	AFWD	2002	2003
Research	AFWD/ACA/Partners	2002	2005
Monitoring	AFWD	2005	Every 5 years
Recovery Plan Review	Maintenance/Recovery Team	2006	2007

*Alberta Fish and Wildlife Division, **Alberta Conservation Association, ***Alberta Parks and Protected Areas

Research is being carried out on the DNA of western blue flag and a preliminary report has been received from the student working on the project (McPherson 2003).

Time frames for the initiation and completion for some of the activities outlined in the implementation schedule have changed since its original development. Inventory and monitoring of western blue flag has been completed more frequently than originally planned due to the continued discovery of additional blue flag sites. Range management plans have been completed for all 8 ranchers currently participating in the Western Blue Flag Conservation Program and they will continue to be offered to new landowners on a first-come priority basis while program funds exist. Range improvements were initiated in 2001 and they will also continue to be completed as new landowners join the program and as funds allow. Ongoing public presentations and poster displays outlining the project provide a means of educating the public and raising public awareness. The *Maintenance and Recovery Plan for Western Blue Flag (Iris missouriensis) in Canada* report and additional species at risk reports for western blue flag are available online at http://www3.gov.ab.ca/srd/fw/riskspecies/.

3.0 WESTERN BLUE FLAG INVENTORY AND MONITORING

Inventories in 2000 and 2001 identified 11 known naturally occurring western blue flag sites in Alberta with a population estimate of 14,757 stems. In 2002, four additional landowners agreed to participate in the Western Blue Flag Conservation Program; permission to inventory a fifth site was not granted. An inventory of the new sites was completed and the landowners agreed to subsequent monitoring. The stem count estimate following the 2002 inventory was 69,000 stems from 13 of 16 known sites, with all sites located in a 300 sq. km. area south of Cardston (Ernst 2003). A summary of the 2002 inventory of western blue flag is contained in Ernst (2003). Western blue flag was reported in 2003 at two new sites, one in Calgary and one in Fort Macleod. This discovery may be considered significant since both sites are located outside the

previously known range. Currently, the Canadian portion of the western blue flag population is estimated as approximately 73,000 stems from 18 known sites.

An inventory and monitoring protocol for western blue flag was designed and initiated in 2002 and repeated in 2003 (Ernst 2003). Monitoring plots were established on each site to facilitate tracking the abundance and distribution of western blue flag populations and to monitor the vigour of the plant over time. The number of monitoring plots for each site was variable, dependent upon site size and habitat variability.

3.1 Small Site Inventories

The 3 small sites (Whiskey Gap, POPP East and POPP West) within the naturally occurring area for western blue flag were inventoried in 2003 (Table 2), as well as the new Calgary International Airport site.

3.2 Results – Small Site Inventories

Compared to the 2002 data, the small site inventories revealed a 3% decrease in the total stem count (-27 stems) and a 39% decrease in flowering/fruiting stems (-37 stems) (Table 2). The POPP West site accounted for a significant portion of the decrease in total stems and flowering/fruiting stems.

Table 2. Small site WBFL inventory results for 2002 and 2003 in SW Alberta

Site	Total # Stems		Total # Fruits/Flowers	
	2002	**2003**	**2002**	**2003**
Whiskey Gap	233	201 (-32)	10	2 (-8)
POPP East	198	277 (+79)	15	29 (+14)
POPP West	458	384 (-74)	70	27 (-43)*
Calgary Airport	N/a	**3774	N/A	**55
Totals	**889**	**862 (-27)**	**95**	**58 (-37)**

Note: Numbers in brackets indicate change from 2002 (+ or -).
*Phenology on this site was behind other sites so some flowering/fruiting stems may have been missed.
** New site-not included in 2003 totals.

3.2.1 Whiskey Gap

Compared to 2002, total stem counts (201) were down by 32 and the number of flowering/fruiting stems (2) decreased by 8 (Table 2). The decrease in early season precipitation in 2003 compared to 2002 may account for this difference. The western blue flag on this site was fenced out in fall 2001, but in 2003 it was observed that approximately 35% of the western blue flag stems were occurring outside of the fenced area, none of which contained flowering stems.

3.2.2 POPP East

This site showed increases in both the total stem count (277) and flowering/fruiting stems (29) from 2002 results (Table 2). Half of the total stem increase came from western blue flag found in willow stands to the NE of the main plot.

3.2.3 POPP West

This site showed an increase in both total stems and flowering/fruiting stems in 2002, but showed substantial reductions in 2003. Total stems (384) were down by 74 (16%) and flowering/fruiting stems (27) were down by 43 (61%) (Table 2). Treatments in the form of litter and competing vegetation removal have been applied at this site for three growing seasons. Because the soil at this location remains saturated for much of the growing season in most years, it seems unlikely that the large increase in 2002 was due to the increased precipitation; however, future monitoring may reveal more information about conditions affecting western blue flag vigour at this site.

3.2.4 Calgary International Airport

This site contains 31 individual clumps ranging in size from 10 stems to 286 stems. Total stem count was 3774, fifty-five of which had seedpods (Table 2). More than 75 stems contained what appeared to be aborted flowers. This is the first site where so many flowering stems have been observed without fruit. There appeared to be predation on some stems.

This site is unique because it is disjunct from naturally occurring western blue flag sites in southwestern Alberta by about 300 km. The western blue flag clumps are on a slight, well-drained west-facing slope containing none of the attributes usually associated with western blue flag habitat. Associated species include crested wheat grass (*Agropyron cristatum),* smooth brome, and Kentucky blue grass.

It is not known how long western blue flag has been present at this site nor how it got there. If it was restricted to a clump or two one might assume that it was simply planted and somehow managed to survive, but the large number of clumps and random distribution indicates that it has been there for some time, perhaps naturally-occurring or transplanted by aboriginals, and appears to be flourishing.

3.2.5 Fort Macleod

This small site was discovered in fall 2003 and was estimated as containing 200 stems. No formal inventory was conducted as a result of it being too late in the season. A site inventory will be carried out in spring 2004.

3.3 Western Blue Flag Monitoring

In June 2003, data was collected from each monitoring plot established in 2002 (Ernst 2003). The primary data collected included the total number of stems and the number of fruiting or flowering stems (Table 3). As well, changes in plant vigour and other factors affecting western blue flag were noted, including changes in associated species. The information was recorded on the same data forms used in 2002 (Appendix A). In addition to the Cardston area sites, one newly recorded site located at the Calgary International Airport was inventoried in July 2003 and four plots were established on the site for long-term monitoring.

Table 3. Western blue flag monitoring results for 2002 and 2003 in SW Alberta

Site	# of Plots	Total # Stems		Total # Fruits/Flowers	
		2002	2003	2002	2003
Carway Customs	2	253	219 (-34)	3	8 (+5)
POPP East	2	76	87 (+11)	13	10 (-3)
POPP West	2	85	81 (-4)	16	6 (-10)
Harrisville West	1	513	658 (+145)	78	104 (+26)
Harrisville East	8	356	367 (+11)	46	40 (-6)
Carway North a	10	425	417 (-8)	67	20 (-47)
Carway North b	3	274	264 (-10)	21	11 (-10)
Carway East	3	144	154 (+10)	20	15 (-5)
Carway South	4	96	83 (-13)	7	6 (-1)
Basin Central	11	1268	1719 (+451)	144	202 (+58)
Basin North	15	856	1013 (+157)	104	152 (+48)
Calgary Airport	4	N/a	*359	N/a	*6
Totals		**4346**	**5062 (+716)**	**519**	**574 (+55)**

Note: Numbers in brackets indicate change from 2002 (+ or -).
*New site-not included in 2003 totals.

3.4 Monitoring Plot Results

Of the 11 sites monitored in both 2002 and 2003 (did not include the Calgary Airport), 6 showed an increase in total stem counts and 4 showed an increase in the number of fruiting or flowering stems (Table 3). Overall, total stems from the monitoring plots increased by 716 (+16%) and flowering/fruiting stems increased by 55 (+11%). Three sites in particular accounted for a significant portion of the increase in the number of total stems and fruiting/flowering stems; Harrisville West, Basin Central, and Basin North.

3.4.1 Carway Customs

As in 2002, both of the monitoring plots on this site had 30% or more of the stems grazed down making it difficult to accurately count stems, particularly flowering/fruiting stems. In comparison to 2002, the total number of stems (219) decreased by 34 while flowering/fruiting stems (8) increased by 5 (Table 3). It is difficult to understand why these plots are selectively grazed as western blue flag is considered unpalatable and because there is ample forage on this site.

3.4.2 POPP East

When compared to 2002 results, data from the 2 plots on this site (87 stems, 10 fruits/flowers) showed an increase in total stem count (+11) but a decrease (-3) for flowering/fruiting stems (Table 3). As in 2002, western blue flag was growing under the willow stands on this site. The vigour of western blue flag under the willow is somewhat surprising because of competition for light, nutrients, and moisture. Smooth brome (*Bromus inermis)* continues to be a major invader on this site.

3.4.3 POPP West

Total stem count (81) from the 2 plots on this site was down by 4 stems and the number of flowering/ fruiting stems (6) decreased by 10 from 2002 results (Table 3). Competing vegetation is a problem on this site, particularly from smooth brome. Treatments in the form of litter and competing vegetation removal have been applied to this site for three years. This site may have marginal habitat conditions because of its proximity to the lakeshore. The soil remains saturated through much of the growing season, and it is not known what impact that has on western blue flag vigour.

3.4.4 Harrisville West

The main monitoring plot on this site was very robust. The total stem count (658) increased by 145 and flowering/fruiting stems (104) increased by 26 from 2002 results (Table 3). Two more monitoring plots were established in 2003 to provide increased monitoring sensitivity at this site.

3.4.5 Harrisville East

Data from the 8 monitoring plots on this site (367 stems, 40 fruits/flowers) was not substantially different from the 2002 data, indicating that the western blue flag population on this site may be relatively stable. Total stem count was up by 11 stems but flowering/ fruiting stems were down by 6 (Table 3). The western blue flag stems scattered throughout the moist meadows on the west end of this site may indicate its ability to compete with species such as sedges (*Carex spp.*) and Kentucky blue grass (*Poa pratensis*). The site is grazed season long but grazing is normally deferred until after mid-June. Vigour at this location was considered good in 2003.

3.4.6 Carway North a

In 2002, 13 monitoring plots were established on this site, however only 10 plots were located in 2003 (plot markers not found). As a result, only data collected from those 10 plots in 2002 and 2003 were compared. The total stem count (417) decreased by 8 and flowering/ fruiting stems (20) decreased by 47 (Table 3). Vigour at this location was generally good but there was extreme litter build-up on portions of this site, particularly in the pasture due south of the buildings. An increase in grazing pressure may help to control this. In future only the 10 monitoring plots found will be used.

3.4.7 Carway North b

Data from the 3 plots on this site (264 stems, 11 fruits/flowers) showed a reduction in both total stem count (-10) and flowering/fruiting stems (-10) from 2002 results (Table 3). This site experiences competition from non-native species such as smooth brome and alfalfa (*Medicago spp.*).

3.4.8 Carway East

Compared to 2002 results, the total stem count (154) from 3 plots at this site decreased by 20 stems and the number of flowering/fruiting stems (15) decreased by 5 (Table 3).

3.4.9 Carway South

Data from the 4 plots on this site (83 stems, 6 fruits/flowers) showed an increase in the total stem count (+7) and a very slight decrease (-1) in flowering/fruiting stems from 2002 results (Table 3).

3.4.10 Basin Central

This site accounted for much of the 2003 increase in total stems and flowering/fruiting stems. Seven of the 11 monitoring plots showed an increase in total stem count and 5 plots showed an increase in the number of flowering stems. Overall, the number of total stems (1719) increased by 451 and flowering/fruiting stems (202) increased by 58 over 2002 results (Table 3).

This location receives heavy livestock use in late winter/early spring but is then rested until late summer. Management and/or habitat conditions must be favourable to western blue flag at this site judging by its generally good vigour. The site was noticeably drier in 2003 compared to 2002.

3.4.11 Basin North

This site, along with Basin Central, accounted for most of the 2003 increase in total stems and flowering/fruiting stems. Twelve out of the 15 monitoring plots showed an increase in total stems and 10 plots showed an increase in the number of flowering stems. Overall, the number of total stems (1013) increased by 157 and flowering/fruiting stems (152) increased by 48 over that found in 2002 (Table 3). Some changes in associated species on a few of the plots were noted, and plenty of increasers and invaders were present on the central portion of the site. Open centres were also recorded for some plots. As at Basin Central, habitat conditions and/or management at this location must be favourable because of the apparent vigour of the western blue flag stands. This site was noticeably drier in 2003 compared to 2002.

3.4.12 Calgary International Airport

Four monitoring plots were established on this site in 2003, ranging in size from 35 stems to 157 stems. Total stem count from the 4 plots was 359, with 6 fruiting stems (Table 3).

3.5 Discussion – 2003 Western Blue Flag Inventory and Monitoring

The amount of spring and early summer precipitation received in 2003 was substantially below that of 2002. During the 2002 inventory and monitoring, saturated soils were still present on many sites during late June and early July. In 2003, most sites were already dry by mid-June when the inventory and monitoring was done. Precipitation from the previous season as well as precipitation from the current season may determine the vigour of western blue flag stands, especially on sites where marginal habitat conditions exist. Long-term monitoring may help reveal how seasonal moisture trends impact the vigour of western blue flag stands.

Monitoring in 2003 showed an increase in Kentucky blue grass. Contrary to 2002, it was the dominant species on approximately 71% of the monitoring plots. Precipitation likely plays a major role in how vigorous the Kentucky blue grass stands are; however, it is not known how the increase in Kentucky blue grass may affect western blue flag vigour. Kentucky blue grass is palatable during the early season so grazing should help to control it on sites where early season grazing occurs.

Inventory and monitoring plot data from 2003 revealed an overall increase in the number of total stems and flowering/fruiting stems from 2002, although some individual sites showed marginal decreases. Site trends must be monitored over several years, with environmental conditions taken into consideration, before they can be fully understood.

4.0 WESTERN BLUE FLAG CONSERVATION PROGRAM – STEWARDSHIP ACTIVITIES

4.1 Range Management Plans and Improvements

A total of 8 land managers who have western blue flag on their property have taken advantage of the Western Blue Flag Conservation Program (Table 4). The program is administered by the Alberta Conservation Association (ACA) and contracts the services of an independent range consultant to do a range inventory of all property held by the participant and to consult with the landowner on ways to improve ranch management. The consultant then produces a range management plan, which also includes recommendations for ranch improvements to benefit western blue flag and prairie conservation. Range management plans have been completed for all 8 participating landowners, however the implementation of management recommendations has not yet taken place for the two newest participants. Three additional landowners have been contacted, however, none of them have chosen to participate in the program to date

Following the vegetation and range resource inventory (VRRI), landowners were presented with recommendations for implementing particular grazing systems and other ranch improvements that would benefit both western blue flag populations and also enhance the overall condition of their rangeland. The range consultant discussed the proposed management changes with landowners prior to the final recommendations being drafted. Those recommendations came in the form of a report prepared by the independent range consultant that provided comprehensive results of the range inventory and range condition and health evaluations, followed by the individual management recommendations.

Through discussions between ACA and participating landowners, partner funding for several improvements has been arranged through the Western Blue Flag Conservation Program. Five ranchers have taken advantage of this aspect of the program through the development and/or improvement of watering facilities, fence improvements and installations, and the use of tame pasture seed for pasture renovation.

Table 4. Participants in the western blue flag conservation program

Landowner Code	Ranch Size (acres)	Management Plan Developed	Management Plan Implemented
WBF001	1280	2001	Yes
WBF002	2500	2001	*No
WBF003	3500	2001	Yes
WBF004	730	2001	*No
WBF005	1291	2002	Yes
WBF006	960	2002	Yes
WBF007	320	2003	In progress
WBF008	1858	2003	In progress

* Some site-specific improvements to benefit western blue flag have been completed (*e.g.* weed/litter removal, fencing); however, management plan has not been fully implemented

5.0 PROGRAM EVALUATION

In 2003 the Alberta Conservation Association and Alberta Fish and Wildlife Division (AFWD) contracted Rangeland Conservation Service (RCS) Ltd. to review the Western Blue Flag Conservation Program and develop a template for monitoring and evaluating the program. This was accomplished through analyzing the results of methods that have been used to monitor plant populations and range health and condition since 2000.

The program evaluation was prepared as a report titled *"Program Evaluation and Monitoring Plan for the Western Blue Flag Conservation Program"* (Rangeland Conservation Service Ltd. 2003). The report reviews the inventory and monitoring protocol for western blue flag and introduces a monitoring process to evaluate the success of range management plans and improvements in achieving the desired objectives of conservation of the species and native prairie in general.

5.1 Landowner Program Evaluation

A landowner questionnaire was developed for the participants in the Western Blue Flag Conservation Program (Appendix B). It was designed to gather information on previous and current land uses, grazing systems, and stocking rates to provide an evaluation of the newly- implemented management recommendations and their overall effectiveness pertaining to the objectives of maintaining western blue flag and improving range condition. The questionnaire also included questions on the willingness of landowners to sign voluntary or legal agreements recognizing their participation in the Western Blue Flag Conservation Program. .

In addition to the questionnaire, two participants in the Western Blue Flag Conservation Program were also provided with grazing record forms to keep track of stock rotations and stocking rates. Over time, this information could provide valuable data regarding the correlation between certain management practices and trends in range condition and western blue flag site numbers.

5.2 Landowner Questionnaire Results

A total of 5 program participants completed the Western Blue Flag Conservation Program Landowner Questionnaire in winter 2003/2004. Overall, the land managers felt they had benefited from being involved with the program. Positive results including improved range condition and slight increases in the number of western blue flag plants were noted. Landowners also expressed that they had benefited significantly simply from their increased knowledge as a result of the range inventory, assessment, and subsequent management recommendations that were completed by an independent range consultant as part of the program. The general consensus regarding signing agreements was that landowners were willing to sign a voluntary agreement but they were not comfortable signing a legal document.

6.0 RESEARCH

Various research activities were recommended in the recovery plan. Research activities such as detailed evaluation of western blue flag ecology were not initiated in 2002-2003 however, a University of Alberta M.Sc. graduate student completed some research on the genetic diversity of western blue flag populations in southern Alberta and neighboring sites in northern Montana through DNA analysis. Results from his study revealed that the majority of southern Alberta sites that were tested appeared to have substantial genetic structure and were distinct. The sites sampled in southern Alberta exhibited genetic diversity, and even individual plants sampled within a meter of each other were genetically distinct (McPherson 2003).

7.0 FUTURE MANAGEMENT/RECOMMENDATIONS

- Alberta Fish and Wildlife Division will continue to encourage Environment Canada to endorse the *Maintenance and Recovery Plan for Western Blue Flag (Iris missouriensis) in Canada* as the National Recovery Plan for the species. The maintenance and recovery team will be involved in the drafting of any amendments.

- Alberta regulations for western blue flag have been developed in draft format and will be conveyed through the process for ministerial approval.

- The Scientific Subcommittee of the Alberta Endangered Species Conservation Committee has been provided with the latest inventory information for western blue flag and has been asked to review the species status.

- Inventory and monitoring activities identified in the recovery plan will continue in 2004.

- Monitor small sites at least every 3 years, and large and medium sites at least every 5 years. If monitoring plot data at specific sites shows a decrease of 20% or greater, inventory the site to determine if the decrease exists across the entire site or just on the monitoring plots.

- Inventory the sites at POPP annually. Continue to investigate methods of improving site conditions at POPP West. The 2 small sites at POPP are the only known western blue flag stands on Alberta public land, so every effort should be made to maintain them in as healthy a condition as possible.

- Implement improved grazing prescriptions for sites where early season grazing on western blue flag stems seems to be a problem.

- Continue to search for additional western blue flag sites, both within its current range and in suitable habitats between Carway, Fort Macleod, and Calgary.

- Continue to work with landowners in conserving and monitoring the western blue flag population.

- Range management plans will be offered to new western blue flag landowners on a first come priority basis as funds allow. Partnering with landowners on ranch improvements that improve management of western blue flag and prairie conservation will also be done as funds allow.

- The program monitoring outlined in the *Program Evaluation and Monitoring Plan for the Western Blue Flag Conservation Program* report will be implemented to provide tracking of management changes and the effects of those changes on western blue flag. This will provide a system to evaluate effectiveness of the cooperative voluntary involvement of landowners as opposed to the use of mechanisms such as legal agreements.

- Research institutions will be encouraged to recruit a graduate student interested in working on the ecology of western blue flag.

- The next annual meeting for the Western Blue Flag Maintenance and Recovery Team will be held during the summer of 2004.

8.0 LITERATURE CITED

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APPENDIX A – SAMPLE DATA FORM

Location: _____ Date: _____UTM NAD 83 Coordinates: _____

Physical Description of sub-site:_____

Number of flowering/fruiting stems: Difference from last inventory:

Number of total stems: Difference from last inventory:

Size of clump E/W axis: Difference from last inventory:

Apparent plant vigor (color, damaged plants, senescence):

Associated dominant plants:

Habitat enhancement since last monitoring? Y N If yes, what:

Remarks:

APPENDIX B – WESTERN BLUE FLAG CONSERVATION PROGRAM LANDOWNER QUESTIONNAIRE

Date: _____ Landowner: _____ Town: _____

Section 1 Land Base and Usage

(1) What is the total land base (*i.e.*, acres) of your operation?

(2) What percentage do the following contribute to the land base of your operation?

__Native prairie
__Seeded pasture
__Hayland
__Cropland

(3) Was a grazing management plan developed for your operations? Y N

Did you adopt it? → Y N Why?

If yes, were you pleased with the level of input you had in the development of the grazing management plan? Y N

In no, would you like one developed for you? Y N

(4) Which of the following best characterizes current grazing management on your operation?

Continuous grazing: Placing livestock on pasture (or a field) in spring and allowing them free access to all or most of the pasture for the entire grazing season until removed in fall.

Rotational grazing: Rotating livestock between pastures (fields) through the grazing season, or making use of cross-fencing to divide the pasture into paddocks and rotating livestock between these paddocks or fields through the grazing season, providing a period of rest to the unoccupied pastures or paddocks.

(5) Are grazing records kept for livestock movements between pastures?

__No
__Yes

If yes (next page);
a) How are these records kept? (Check all that apply)

__Days in a field
__Animal units (AU)/acre or acres/AU
__AU per month (AUM)
__Other_____

b) Are livestock weights or AU equivalents (AUE) noted (ex., 1 bull = 1.5 AUE)?

__No
__Yes

(6) How do you determine the amount of time livestock spend in each grazing unit? (If different methods are used for different types of pasture, please indicate which type of pasture they are used for.)

__Predetermined number of days
How many days?_____
__Forage height
At what forage height are livestock moved?_____
__Percent of pasture utilized
At what percent of utilization are livestock moved?_____
__Other method_____

(7) When was the last time you reviewed your management plan?

_____

(8) Has the size of your herd changed since the management plan was developed?

increased - by how much _____
decreased - by how much _____
remained the same

Section 2 **Characterization of Rotational Grazing System (Answer this section if a rotational grazing system is used on your operation)**

(9) How much of your land base is used in a rotational grazing system?

(10) Which components are included in the rotational grazing system?

Native prairie ____
Seeded pasture____
Hayland ____
Cropland _____

(11) Were range improvements required to implement a rotational grazing system?

__No
__Yes

If yes, what kind? (Check all that apply)

__Stockwater development	__Changing breeding program
__Fencing	__Additional supplements
__Seeded pasture renovation	__Other_____

(12) What other range improvements would be needed to make your rotational grazing system more efficient or incorporate more of the land base into a rotational grazing system?

Section 3 Effect of Grazing Management Plan on Operation and Native Prairie

(13) Has there been an increase in management input as a result of the new grazing system?

__No
__Yes

If yes, what has increased? (Check all that apply)

__Monitoring (livestock, fences, water, supplements)
__Planning
__Herd movement
__Record keeping
__Other_____

(14) Has the management plan proven beneficial to your operation?

Yes- How? No- Why?

(15) Has there been change in the amount of annual growth (carryover)?

More carryover Approximately how much? _____%
Less carryover Approximately how much? _____%
About the same condition

(16) a) What % of the annual growth would you prefer to be left as residual cover? ___
b) Do you see the benefit of leaving residual cover?

Y- In what way?
N

(17) Are you now able to identify more key grass species (i.e. crested wheat grass, blue grama grass, rough fescue) than before the management plan was developed?

Y (name a few- comments)
N

(18) Are you now able to identify more invader species (i.e. Canada thistle, hound's tongue) than before the management plan was developed? Y (name a few-comments) N

(19) Is your range in better, worse, or about the same condition as before the management plan was developed?

Better condition	By what degree?	_____
Worse condition	By what degree?	_____
About the same condition		

Section 4 Effect of Grazing Management Plan on Western Blue Flag

(20) Are you seeing a change in the number of western blue flag plants since implementing the management plan?

Increase	Trace (<1%)	Decrease	Trace (<1%)
	1-10%		1-10%
	10-25%		10-25%
	25-50%		25-50%
	>50%		>50%

(21) How would you characterize the grazing that occurs in the vicinity of western blue flag plants? (e.g., grazing pressure, time of year grazing occurs, carryover, others)

(22) Is there a stockwater source nearby the western blue flag plants? What type?

(23) What grazing impacts have you noticed on the western blue flag plants? (Good or bad)

Section 7 Western Blue Flag Program Participation

(24) Have you discussed the program with your friends, neighbors, etc?
__No
__Yes

Comments:

(25) Have you recommended the program to anyone?
__No
__Yes

Comments:

(26) Would you consider funding subsequent range inventories to be completed for your ranch?

Y _____ 2 years N Any Reason?
_____
_____ 5 years
_____
_____ 10 years
_____

(27) What would you rate as the primary benefit of being involved with the Western Blue Flag Program?

(28) From a ranchers perspective how do you think we could improve the program?

Comments:

(29) Do you feel this approach should be used for other Species at Risk in Alberta?
Y N

Comments:

(30) Would you be comfortable/willing to sign a voluntary agreement that recognizes your participation in the Western Blue Flag Conservation Program?

With ACA? _ With Albert Fish & Wildlife? _ With both? _ Not at all? _

(31) Would you be comfortable/willing to sign a voluntary agreement that recognizes your participation in the Western Blue Flag Conservation Program if this was deemed to satisfy requirements of the federal Species at Risk Act?

With ACA? _ With Albert Fish & Wildlife? _ With both? _ Not at all? _

(32) Would you be comfortable/willing to sign a legal agreement that recognizes your participation in the Western Blue Flag Conservation Program?

With ACA? _ With Albert Fish & Wildlife? _ With both? _ Not at all? _

(33) Would you be comfortable/willing to sign a legal agreement that recognizes your participation in the Western Blue Flag Conservation Program if this was deemed to satisfy requirements of the federal Species at Risk Act?

With ACA? _ With Albert Fish & Wildlife? _ With both? _ Not at all? _